more to be apprehended and appreciated—the theory by which they have been obtained.

In the chapter on the "Dimensions of Electrical Quantities," the author introduces besides μ and K a third constant p, which may arise in connection with the relation between the current and the magnetic intensity at any point in the field produced, so that 4π times the current flowing through a closed path in a magnetic field is equal to p times the work done in carrying a unit pole once round the path. The dimensions of this constant are of course unknown, and it is only by assuming its dimensions to be zero that the ordinary dimensions of current in electromagnetic units are obtained. There does not seem any distinctly physical ground for bringing in this constant p. The work done in carrying a pole in a complete circuit round a current is independent of the nature of the medium, and hence, justifiably so far as we can see, it may be taken as unity, without involving any neglect of the physical properties of the medium.

The method of the motion of Faraday tubes of electric induction is used in the chapter on "Dielectric Currents and the Electromagnetic Theory of Light." Perhaps it is possible to make too much of this conception; but there can be no question of its great utility as a means of keeping before the mind of the reader the idea of electric and magnetic action as taking place in the medium, and visualising, as it were, what takes place when a condenser is joined to another and partially discharged, when a current flows in a circuit, and the flux of energy in the medium which accompanies all such changes, whether constant or rapidly variable.

The commendation which the work of Prof. J. J. Thomson thoroughly deserves is the due also of that which Prof. Carey Foster and Dr. Atkinson have based on the elementary treatise of M. Joubert. This work has been recast so as to bring it thoroughly into accordance with the later views of electrical theory, and there can be no question of the entire success with which the English authors have performed their task. The book is a thoroughly sound and practical treatise. In it too, though not to the same extent, for its aim is different in some degree, there is a good deal of fairly advanced theory, and like the former work, it shows no shirking or glossing over of difficulties. It contains a more detailed account of the experimental details of the subject than the other work, and this, by the use of a somewhat small but still perfectly clear type, is got in without unduly swelling the volume. The two books read together would form an excellent combination. They are enough to give any competent student a most desirable acquaintance with the essential parts of the main phenomena, and their elementary theory. Such a student would afterwards go easily and rapidly forward with the study of the more elaborate theoretical works, and of the researches which have lately advanced electricity so much—the absolute determinations of electrical constants which have been made by so many experimenters, and the improved science of electrical measurement which these, together with the experimental investigation of the electromagnetic theory of light, and the vast development of practical electricity, have brought into existence.

A. GRAY.

ANNALS OF THE CALCUTTA BOTANIC GARDEN.

Annals of the Royal Botanic Garden, Calcutta. Vol. v. Part I. Pp. 9 + 68, 101 plates. (Calcutta: the Bengal Secretariat Press, 1895.

THE Royal Botanic Garden, Calcutta, has been publishing from time to time a series of "Annals," illustrative of the flora of the continent of India, the adjacent islands, and the contiguous countries. Volume v. of this work was published last year, and Part I consists of "A Century of Indian Orchids" by the chief of contemporary botanists, Sir Joseph Hooker. The Calcutta Garden has had the advantage of the services and labours of a long series of eminent botanists. Volume v. of the "Annals" is dedicated to perhaps the most distinguished of them, Roxburgh, superintendent from 1793 to 1814, and author of the "Plants of the Coromandel," the "Hortus Bengalensis," and the "Flora Indica," of whom a portrait and a brief memoir are prefixed. It may be well to recall the names of Roxburgh's successors to show how well botany has been served in connection with these gardens. They have been Wallich, Falconer, Thomson, Anderson, Clarke, and King; the last named, an admirable administrator and a distinguished botanist, being still in charge.

Since Roxburgh's time, that is for more than a century, what Sir Joseph Hooker describes as a "magnificent series of Indian plant-portraits by native artists" has been accumulating in the Calcutta Botanic Garden, of which about a thousand are those of orchids.

"The most important of these collections," says Sir Joseph ("Flora of British India," vol. v. p. 176) "were Malayan, abounding in novelties from Penang, Perak, Singapore and Malacca, made by the late Father Scortechini, . . . by Kunstler (a collector sent from the Calcutta Botanical Gardens by Dr. King), by Curtis Hullett, Wray and Ridley. Important collections were also sent by Mann from Assam, Bhotan, and the Khasia Hills; by Gamble from various parts of India; by Duthie from Garwhal; by Clarke from Sikkim, the Khasia Hills, and Bengal, together with a few from Central India; and by Dr. Trimen from Ceylon."

So little accessible were these drawings, and so little was their value known, that it was not until Sir Joseph Hooker had almost completed, as he mentions in his brief preface to the "Century," the descriptions of Indian orchids for his monumental work, the "Flora of British India," that he obtained, through Dr. King, the loan of the native drawings referred to. Sir Joseph further states that "the inspection of these drawings," coupled with the study of other material received from Calcutta, "necessitated a revision of the characters of the greater portion of the species already described, . . . together with the addition of not a few new species."

With reference to these drawings, the author states that, excellent as they are in many respects, they betray "that tendency to enlarge, which is the besetting sin of Indian botanical artists." Perhaps it is rather the indifference to exact accuracy—a strongly-marked characteristic of all Indian artists—which is in fault. No one who has had to do with Indian workmen can have failed to notice how difficult it is to induce them to recognise the importance of accurate measurements and proportions.

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Now that so much attention is devoted to orchids in the gardens of Great Britain, and that their cultivation is, comparatively speaking, well understood, the publication of such a volume as the "Century" by our great botanist is a valuable help, not only to botanists, but to gardeners. Although all accessible parts of India have been searched through and through by experienced collectors, it is nevertheless a fact that comparatively few of the plants comprised in the "Century" are known to be in cultivation. Take, for example, the beautiful genus *Dendrobium*, of which so many charming species adorn orchid houses. Eighteen species of the genus are figured and described in the "Century," of which but one is to be found in Veitch's "Manual of Orchidaceous Plants," the best and most complete book on the subject. Even in the recently published "Hand-List of Orchids cultivated in the Royal Gardens" at Kew, there are mentioned but four out of the eighteen. There is an unfortunate tendency among orchid growers to view with scant favour the vast number of beautiful, delicate and interesting *small* orchids. An examination of the plates in the "Century"—which, by the by, are somewhat coarsely coloured—must prove that there are numerous genera and species well worth care and cultivation, even though they may not be as showy as a *Cattleya* or an *Odontoglossum*

Among the more striking of the plants figured in the "Century" are *Dendrobium crocatum* (Hook. f.), with its brilliant orange-coloured flowers; *D. Williamsoni* (Reichb. f.); *D. leonis* (Reichb. f.), with its remarkable imbricated leaves, and exquisite scent of vanille; *Cirrhopetalum gamosepalum* (Griff.); *C. refractum* (Zoll); and *Eria obesa* (Lindl.), with its clusters of spindle-shaped bulbs. Among others the following would be valuable additions to collections from a horticultural point of view—viz. *Acanthephippium striatum* (Lindl.); *Phaius Mishmeensis* (Reichb. f.); *Calanthe herbacea* (Lindl.), a very handsome plant growing in the Sikkim Himalayas, at an altitude of from 4000 to 6000 feet; *Eulophia* (*Cyrtopera*) *nuda* (Lindl.), figured in four varieties, of which the variety *purpurea* is the most distinct; *Eulophia* (*Cyrtopera*) *macrobulbon* (Hook.); *Sarcanthus insectifer* (Reichb. f.), a remarkable and exceptionally bright-coloured species from the Chittagong Hills; and several fine species of the genus *Habenaria*.

As the botanical descriptions in this work are from the pen of Sir Joseph Hooker, it would be presumptuous to praise them. Notes are appended to nearly every description, giving the habitat of the plant, the height above the sea at which it was found, the name of the discoverer where known, and other particulars.

As few of these beautiful and interesting orchids are even mentioned in manuals and lists of cultivated orchids, there is evidently still a wide field for orchid collectors, even in easily accessible parts of the British Empire and the neighbouring countries. And who knows but that the zeal of some collector working in the country north of the Bay of Bengal, might be rewarded at any moment by a re-discovery of that rare gem among slipper orchids, *C. Fairrieanum!* There has been but one importation, in 1857, of this elegant and graceful plant. "Its blossoms," says the late Sir William Hooker, "are certainly among the most exquisitely coloured and pencilled of any in this fine genus." It comes from Assam or Bhotan, countries well within reach; but probably has a very restricted habitat, and a station remote and difficult of access. Still the commercial value of an importation would be so great, that the zeal of importers and collectors ought not to cool until success crowns their efforts. The recent re-discovery of the habitat of the true *Cattleya labiata* (*autumnalis*), found by Swainson in 1818 on the Organ Mountains in Brazil, and lost sight of for over seventy years, is a case in point. May a like happy chance occur in the case of *Cypripedium Fairrieanum!* T. L.

OUR MINERAL INDUSTRIES.

First Annual General Report upon the Mineral Industry of the United Kingdom oj Great Britain and Ireland for the year 1894. By C. Le Neve Foster, D.Sc., F.R.S. Pp. 144. Seventeen plates. (London: Printed for Her Majesty's Stationery Office, 1895.)

EVER since the year 1853 the position of the mineral industries of this country has been regularly recorded in an official volume, issued annually under the title of "Mineral Statistics of the United Kingdom." A series of these annuals, extending over nearly thirty years, was prepared under the direction of the late Mr. Robert Hunt, and issued from the Mining Record Office in Jermyn Street. For several years, however, two sets of returns were published concurrently—one set by Mr. Hunt, whose figures were obtained by the voluntary aid of mine-owners, and another set by the Inspectors of Mines, whose statistics were based upon statutory returns, and, consequently, came to be regarded as more trustworthy. To avoid the inconvenience of such duplication, the work of the Mining Record Office was taken over, in 1882, by the Home Office; and thenceforth there issued annually from this department a statistical volume as well as the ordinary Reports of the several Inspectors of Mines. These two publications have hitherto been the only official sources of information on mining published in this country. But something more was evidently wanted—something rather in the shape of a general year-book of mines and minerals. The publication of a comprehensive report of this character was suggested by the Royal Commission on Mining Royalties, and the suggestion was endorsed by the Departmental Committee on Mining and Mineral Statistics. At the request of the Home Secretary, Prof. Le Neve Foster undertook the preparation of such a report; and, considering the initial difficulties incidental to an undertaking of this kind, he is to be heartily congratulated on the work which he has produced.

After an introductory essay, explanatory of the various laws which regulate the working of minerals in this country, Prof. Foster deals with the statistics of the mining population. It appears that the number of persons employed underground in our mines during the year 1894 was 589,689, whilst those working in connection with surface-operations numbered 149,408; thus giving a total mining population of 739,097. The distribution of the underground workers in the various counties is represented on a coloured map, which shows at a glance that Durham and Glamorgan are the two counties with the

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